

Evaluating the Simulation of Metacommunities for Riverine Fishes (SMURF) in the Calapooia Basin, OR

Ryan Brown^{1,3}, Joe Ebersole¹, Brenda Rashleigh², Allen Brookes¹, George Boxall⁴, and Jordan Massie^{1,5},

(1)US Environmental Protection Agency, Western Ecology Division, Corvallis, OR, (2)US Environmental Protection Agency, Atlantic Ecology Division, Narragansett, RI (3)EPA Pathways Intern, EPA Western Ecology Division, Corvallis, OR (4) Amnis Opes, LCC, Albany, OR (5)Student Services Contractor, EPA Western Ecology Division, Corvallis, OR

We describe a modeling approach for simulating assemblages of fish in riverine landscapes. The approach allows a user to determine the grain and extent of river networks within which fish populations reproduce, move, and survive in response to both environmental drivers and assemblage interactions. We apply the model to the Calapooia River in the Willamette River basin of Oregon, a region where human population and water demand are expected to grow substantially over the next 50 years. By explicitly defining fish population responses to environmental factors such as streamflow and temperature, and interaction weights accounting for predation and competition, the approach provides a heuristic tool for identifying critical data gaps for projecting the effects of future landscape scenarios and climate conditions on fish assemblages. The model is evaluated by comparing output to existing fish population data from the Calapooia Basin. Initial results provide testable hypotheses regarding species distributions within the basin and projected responses to climate change, water consumption, and restoration actions.

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